PROCEEDINGS OF SPIE

Research Using Extreme Light: Entering New Frontiers with Petawatt-Class Lasers IV

Georg Korn Luis O. Silva Sergei V. Bulanov Editors

1–3 April 2019 Prague, Czech Republic

Sponsored and Published by SPIE

Volume 11039

Proceedings of SPIE 0277-786X, V. 11039

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigital Library.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from these proceedings:

Author(s), "Title of Paper," in Research Using Extreme Light: Entering New Frontiers with Petawatt-Class Lasers IV, edited by Georg Korn, Luis O. Silva, Sergei V. Bulanov, Proceedings of SPIE Vol. 11039 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

ISSN: 0277-786X ISSN: 1996-756X (electronic)

ISBN: 9781510627444 ISBN: 9781510627451 (electronic)

Published by **SPIE** P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445 SPIE.org Copyright © 2019, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/19/\$18.00.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.



Paper Numbering: Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

• The first five digits correspond to the SPIE volume number.

• The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc. The CID Number appears on each page of the manuscript.

Contents

- v Authors
- vii Conference Committee

EXTREME FIELD LIMITS I

11039 02 Nonlinear quantum electrodynamics in ultra-high intensity laser-plasma interactions (Invited Paper) [11039-1]

HIGH ENERGY PHOTON PHYSICS I

11039 0H High order harmonics generation via laser reflection at electron density peaks [11039-16]

EXTREME LIGHT FACILITIES, PROJECTS, DIRECTIONS II

11039 OR Development of a new generation FEL based on LWFA at ELI Beamlines [11039-27]

POSTERS-WEDNESDAY

- Potential to measure quantum effects in recent all-optical radiation reaction experiments [11039-44]
- 11039 1E The effect of pre-plasma formed under the nonlocal transport conditions on the interaction of the ultrahigh intensity laser with a solid target [11039-48]
- 11039 1F Electromagnetic shock waves propagating in quantum vacuum [11039-49]